

# TigerSwitch 1000

## Gigabit Ethernet Switch

- ◆ 6 auto-MDIX 10/100/1000BASE-T ports
- ◆ Two slots for hot-swappable 1000BASE-X GBIC modules
- ◆ 16 Gbps of aggregate switch bandwidth
- ◆ Support for redundant power unit
- ◆ Up to four port trunks per switch
- ◆ Port mirroring for non-intrusive analysis
- ◆ QoS support for two-level priority
- ◆ Full support for IEEE 802.1Q VLANs
- ◆ IGMP multicast filtering and snooping
- ◆ Manageable via console, Web, SNMP/RMON





# **TigerSwitch 1000 Installation Guide**

---

From SMC's Tiger line of feature-rich workgroup LAN solutions

**SMC**®

**N e t w o r k s**

6 Hughes

Irvine, CA 92618

Phone: (949) 707-2400

October 2001

Pub. #150200001800A R02

Information furnished by SMC Networks, Inc. (SMC) is believed to be accurate and reliable. However, no responsibility is assumed by SMC for its use, nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SMC. SMC reserves the right to change specifications at any time without notice.

Copyright © 2001 by  
SMC Networks, Inc.  
6 Hughes  
Irvine, CA 92618  
All rights reserved. Printed in Taiwan

**Trademarks:**

SMC is a registered trademark; and EZ Switch, TigerStack and TigerSwitch are trademarks of SMC Networks, Inc. Other product and company names are trademarks or registered trademarks of their respective holders.

## Limited Warranty

**Limited Warranty Statement:** SMC Networks, Inc. ("SMC") warrants its products to be free from defects in workmanship and materials, under normal use and service, for the applicable warranty term. All SMC products carry a standard 90-day limited warranty from the date of purchase from SMC or its Authorized Reseller. SMC may, at its own discretion, repair or replace any product not operating as warranted with a similar or functionally equivalent product, during the applicable warranty term. SMC will endeavor to repair or replace any product returned under warranty within 30 days of receipt of the product.

The standard limited warranty can be upgraded to a Limited Lifetime\* warranty by registering new products within 30 days of purchase from SMC or its Authorized Reseller. Registration can be accomplished via the enclosed product registration card or online via the SMC web site. Failure to register will not affect the standard limited warranty. The Limited Lifetime warranty covers a product during the Life of that Product, which is defined as the period of time during which the product is an "Active" SMC product. A product is considered to be "Active" while it is listed on the current SMC price list. As new technologies emerge, older technologies become obsolete and SMC will, at its discretion, replace an older product in its product line with one that incorporates these newer technologies. At that point, the obsolete product is discontinued and is no longer an "Active" SMC product. A list of discontinued products with their respective dates of discontinuance can be found at [http://www.smc.com/smc/pages\\_html/support.html](http://www.smc.com/smc/pages_html/support.html).

All products that are replaced become the property of SMC. Replacement products may be either new or reconditioned. Any replaced or repaired product carries either a 30-day limited warranty or the remainder of the initial warranty, whichever is longer. SMC is not responsible for any custom software or firmware, configuration information, or memory data of Customer contained in, stored on, or integrated with any products returned to SMC pursuant to any warranty. Products returned to SMC should have any customer-installed accessory or add-on components, such as expansion modules, removed prior to returning the product for replacement. SMC is not responsible for these items if they are returned with the product.

Customers must contact SMC for a Return Material Authorization number prior to returning any product to SMC. Proof of purchase may be required. Any product returned to SMC without a valid Return Material Authorization (RMA) number clearly marked on the outside of the package will be returned to customers at customer's expense. For warranty claims within North America, please call our toll-free customer support number at (800) 762-4968. Customers are responsible for all shipping charges from their facility to SMC. SMC is responsible for return shipping charges from SMC to customer.

**WARRANTIES EXCLUSIVE:** IF AN SMC PRODUCT DOES NOT OPERATE AS WARRANTED ABOVE, CUSTOMER'S SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT OF THE PRODUCT IN QUESTION, AT SMC'S OPTION. THE FOREGOING WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, EITHER

## *LIMITED WARRANTY*

IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SMC NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE OR USE OF ITS PRODUCTS. SMC SHALL NOT BE LIABLE UNDER THIS WARRANTY IF ITS TESTING AND EXAMINATION DISCLOSE THE ALLEGED DEFECT IN THE PRODUCT DOES NOT EXIST OR WAS CAUSED BY CUSTOMER'S OR ANY THIRD PERSON'S MISUSE, NEGLIGENCE, IMPROPER INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING, OR OTHER HAZARD.

LIMITATION OF LIABILITY: IN NO EVENT, WHETHER BASED IN CONTRACT OR TORT (INCLUDING NEGLIGENCE), SHALL SMC BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY KIND, OR FOR LOSS OF REVENUE, LOSS OF BUSINESS, OR OTHER FINANCIAL LOSS ARISING OUT OF OR IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE, USE, PERFORMANCE, FAILURE, OR INTERRUPTION OF ITS PRODUCTS, EVEN IF SMC OR ITS AUTHORIZED RESELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR THE LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR CONSUMER PRODUCTS, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE. NOTHING IN THIS WARRANTY SHALL BE TAKEN TO AFFECT YOUR STATUTORY RIGHTS.

\* SMC will provide warranty service for one year following discontinuance from the active SMC price list. Under the limited lifetime warranty, internal and external power supplies, fans, and cables are covered by a standard one-year warranty from date of purchase.

SMC Networks, Inc.  
6 Hughes  
Irvine, CA 92618

# COMPLIANCES

## FCC - Class A

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

You may use Category 5 or 5e UTP or STP cable for RJ-45 connections. Use 62.5/125 or 50/125 micron multimode fiber cable, or 9/125 singlemode fiber cable for SC connections.

- Warnings**
1. Wear an anti-static wrist strap or take other suitable measures to prevent electrostatic discharge when handling this equipment.
  2. When connecting this hub to a power outlet, connect the field ground lead on the tri-pole power plug to a valid earth ground line to prevent electrical hazards.

## Industry Canada - Class A

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministère des Communications.

## Japan VCCI Class A

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

## EC Conformance Declaration - Class A

SMC contact for these products in Europe is:

SMC Networks Europe,  
Edificio Conata II,  
Calle Fructuós Gelabert 6-8, 2<sup>a</sup>, 4<sup>a</sup>,  
08970 - Sant Joan Despí,  
Barcelona, Spain.

This information technology equipment complies with the requirements of the Council Directive 89/336/EEC on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility and 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with these Directives, the following standards were applied:

- RFI Emission:
- Limit class A according to EN 55022:1998
  - Limit class A for harmonic current emission according to EN 61000-3-2:1995
  - Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3:1995
- Immunity:
- Product family standard according to EN 55024:1998
  - Electrostatic Discharge according to EN 61000-4-2:1995 (Contact Discharge:  $\pm 4$  kV, Air Discharge:  $\pm 8$  kV)
  - Radio-frequency electromagnetic field according to EN 61000-4-3:1996 (80 - 1000 MHz with 1 kHz AM 80% Modulation: 3 V/m)
  - Electrical fast transient/burst according to EN 61000-4-4:1995 (AC/DC power supply:  $\pm 1$  kV, Data/Signal lines:  $\pm 0.5$  kV)
  - Surge immunity test according to EN 61000-4-5:1995 (AC/DC Line to Line:  $\pm 1$  kV, AC/DC Line to Earth:  $\pm 2$  kV)
  - Immunity to conducted disturbances, Induced by radio-frequency fields: EN 61000-4-6:1996 (0.15 - 80 MHz with 1 kHz AM 80% Modulation: 3 V/m)
  - Power frequency magnetic field immunity test according to EN 61000-4-8:1993 (1 A/m at frequency 50 Hz)
  - Voltage dips, short interruptions and voltage variations immunity test according to EN 61000-4-11:1994 (>95% Reduction @10 ms, 30% Reduction @500 ms, >95% Reduction @5000 ms)
- LVD:
- EN 60950 (A1/1992; A2/1993; A3/1993; A4/1995; A11/1997)



## **Taiwan BSMI Class A**

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## **Australia AS/NZS 3548 (1995) - Class A**



ACN 069 351 613

SMC contact for products in Australia is:

SMC Communications Pty. Ltd.  
Suite 18, 12 Tryon Road,  
Lindfield NSW2070,  
Phone: 61-2-94160437  
Fax: 61-2-94160474

## Safety Compliance

### Warning: Fiber Optic Port Safety



When using a fiber optic port, never look at the transmit laser while it is powered on. Also, never look directly at the fiber TX port and fiber cable ends when they are powered on.

### Avertissement: Ports pour fibres optiques - sécurité sur le plan optique



Ne regardez jamais le laser tant qu'il est sous tension. Ne regardez jamais directement le port TX (Transmission) à fibres optiques et les embouts de câbles à fibres optiques tant qu'ils sont sous tension.

### Warnhinweis: Faseroptikanschlüsse - Optische Sicherheit



Niemals ein Übertragungslaser betrachten, während dieses eingeschaltet ist. Niemals direkt auf den Faser-TX-Anschluß und auf die Faserkabelenden schauen, während diese eingeschaltet sind.

## Underwriters Laboratories Compliance Statement

**Important!** Before making connections, make sure you have the correct cord set. Check it (read the label on the cable) against the following:

Operating Voltage	Cord Set Specifications
120 Volts	UL Listed/CSA Certified Cord Set
	Minimum 18 AWG
	Type SVT or SJT three conductor cord
	Maximum length of 15 feet
	Parallel blade, grounding type attachment plug rated 15A, 125V
240 Volts (Europe only)	Cord Set with H05VV-F cord having three conductors with minimum diameter of 0.75 mm <sup>2</sup>
	IEC-320 receptacle
	Male plug rated 10A, 250V

The unit automatically matches the connected input voltage. Therefore, no additional adjustments are necessary when connecting it to any input voltage within the range marked on the rear panel.

**Wichtige Sicherheitshinweise (Germany)**

1. Bitte lesen Sie diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie keine Flüssigoder Aerosolreiniger. Am besten eignet sich ein angefeuchtetes Tuch zur Reinigung.
4. Die Netzanschlusßsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Beschädigungen hervorrufen.
7. Die Belüftungsöffnungen dienen der Luftzirkulation, die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.
9. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen, die sich am Gerät befinden, sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von autorisiertem Servicepersonal geöffnet werden.
14. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
  - a. Netzkabel oder Netzstecker sind beschädigt.
  - b. Flüssigkeit ist in das Gerät eingedrungen.
  - c. Das Gerät war Feuchtigkeit ausgesetzt.
  - d. Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
  - e. Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
  - f. Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.
15. Zum Netzanschluß dieses Gerätes ist eine geprüfte Leitung zu verwenden. Für einen Nennstrom bis 6A und einem Gerätegewicht größer 3kg ist eine Leitung nicht leichter als H05VV-F, 3G, 0.75mm<sup>2</sup> einzusetzen.

Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70dB(A) oder weniger.



# TABLE OF CONTENTS

## **Index 7**

### **1**

#### **About the**

#### **TigerSwitch 1000 1-1**

Overview .....	1-1
Description of Hardware .....	1-2
1000BASE-T Ports .....	1-2
GBIC Slots .....	1-2
Status LEDs .....	1-3
Network Management Agent .....	1-4
Optional Redundant Power Unit .....	1-6
Power Supply Receptacles .....	1-6
Features and Benefits .....	1-7
Connectivity .....	1-7
Performance .....	1-7
Management .....	1-8

### **2**

#### **Network Planning 2-1**

Introduction to Switching .....	2-1
Sample Applications .....	2-2
Backbone Consolidation .....	2-2
Making VLAN Connections .....	2-3
Connectivity Rules .....	2-4
1000 Mbps Gigabit Ethernet Collision Domain .....	2-4
100 Mbps Fast Ethernet Collision Domain .....	2-5
10 Mbps Ethernet Collision Domain .....	2-6
Application Notes .....	2-6

### **3**

#### **Installing the Switch 3-1**

Selecting a Site .....	3-1
Equipment Checklist .....	3-2
Package Contents .....	3-2

*TABLE OF CONTENTS*

Optional Rack-Mounting Equipment . . . . .	3-2
Mounting . . . . .	3-3
Rack Mounting . . . . .	3-3
Desktop or Shelf Mounting . . . . .	3-5
Installing a GBIC Transceiver . . . . .	3-6
Connecting to a Power Source . . . . .	3-7

**4**

**Making Network Connections 4-1**

Connecting Network Devices . . . . .	4-1
Connecting to 1000BASE-T Devices . . . . .	4-2
Connecting to an SC-Type Fiber Port . . . . .	4-3

**A**

**Troubleshooting A-1**

Diagnosing Switch Indicators . . . . .	A-1
Power and Cooling Problems . . . . .	A-1
Installation . . . . .	A-2
In-Band Access . . . . .	A-2

**B**

**Cables B-1**

Specifications . . . . .	B-1
Twisted-Pair Cable and Pin Assignments . . . . .	B-2
1000BASE-T Pin Assignments . . . . .	B-2
1000BASE-T Cable Requirements . . . . .	B-4
Cable Testing for Existing Category 5 Cable . . . . .	B-4
Adjusting Existing Category 5 Cabling . . . . .	B-4
Console Port Pin Assignments . . . . .	B-5
DB-9 Port Pin Assignments . . . . .	B-5
Console Port to 9-Pin COM Port on PC . . . . .	B-6
Console Port to 25-Pin DTE Port on PC . . . . .	B-6

**C**

**Specifications C-1**

Physical Characteristics . . . . .	C-1
------------------------------------	-----

Switch Features .....	C-2
Management Features .....	C-3
Standards .....	C-3
Compliances .....	C-4
Warranty .....	C-4

## **D**

### **Ordering Information D-1**

### **Glossary 1**

### **Index Index-1**

*TABLE OF CONTENTS*



# CHAPTER 1

## ABOUT THE

### TIGERSWITCH 1000

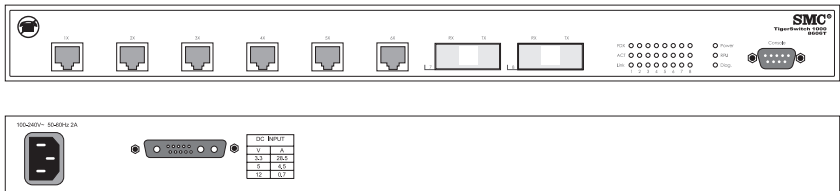
---

#### **Overview**

The TigerSwitch 1000 is a high-performance Gigabit Ethernet switch designed for the network core. It provides eight 1000 Mbps ports that can significantly improve the performance of your network's backbone, and deliver the throughput needed to support a broad range of advanced network applications.

With 16 Gigabits of aggregate bandwidth, the TigerSwitch 1000 can provide the quickest solution to meeting the growing demands on your network's limited resources. This switch has six 1000BASE-T RJ-45 twisted-pair ports and two GBIC slots. Each 1000 Mbps port can support high-bandwidth connectivity within or between workgroups, and increased capacity for server farms, giving your users faster access to network-wide resources.

The TigerSwitch 1000 includes a built-in management agent that allows you to configure or monitor the switch using the embedded management program or SNMP/RMON applications. To manage the switch, you can make a direct connection to the console port on the switch's front panel. You can also make a network connection to manage the switch using Telnet, the on-board Web agent, or any SNMP-based network management software.



**Figure 1-1. Front and Rear Panels**

# Description of Hardware

## 1000BASE-T Ports

These ports are RJ-45 ports that operate at 10 Mbps, 100 Mbps and 1000 Mbps, full and half duplex. The ports can be connected to other IEEE 802.3ab 1000BASE-T compliant devices up to 100 m (328 ft.) away using Category 5 twisted-pair cable.

Each port also supports the IEEE 802.3x auto-negotiation of flow control, so the switch can automatically prevent port buffers becoming saturated.

## GBIC Slots

The two slots on the switch front panel are for installing optional 5V GBIC transceivers. Note that GBIC transceivers are hot-swappable. You do not need to power off the switch before installing or removing a transceiver.

Status LEDs

The LEDs, which are located on the front panel for easy viewing, are shown below and described in the following table.

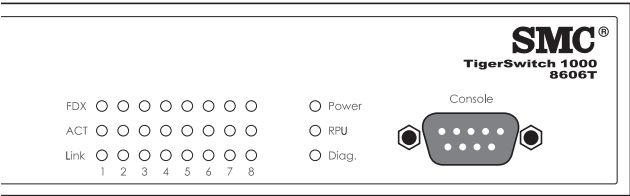


Figure 1-2. Port and System LEDs

Port and System Status LEDs		
LED	Condition	Status
Power	On Green	Switch is receiving power.
	Off	Power off or failure.
RPU	On Green	Redundant power unit is attached and is operating in a load-sharing mode.
	Off	Power off or failure.
Diag.	Flashing Green	System self-diagnostic test in progress.
	On Green	System self-diagnostic test successfully completed.
	On Amber	System self-diagnostic test has failed.

Port and System Status LEDs		
LED	Condition	Status
RJ-45 Ports		
Link	Flashing Green	Port is operating at 1000 Mbps.
	On Green	Port is operating at 100 Mbps.
	On Amber	Port is operating at 10 Mbps.
	Flashing Amber	Port has been manually disabled.
	Off	There is no valid link on the port.
ACT	On Green	Traffic is passing through the port.
FDX	On Green	Port is operating at full duplex.
	On Amber	Port is operating in half-duplex mode.

**Network Management Agent**

The TigerSwitch 1000 includes a built-in network management agent. The agent offers a variety of management options, including SNMP, RMON and a Web-based interface. The switch also provides a serial port on the rear panel for out-of-band management. This is an RS-232 serial port with a DB-9 connector. A PC may be connected to this port for configuration and monitoring purposes out-of band via a full-handshaking null-modem cable. (See Appendix B for a description of wiring options.)

The network management agent provides a wide range of advanced performance-enhancing features. Port-based and tagged VLANs provide traffic security and efficient use of network bandwidth. QoS priority queueing ensures the minimum delay for moving real-time multi-media data across the network. Flow control eliminates the loss of packets due to bottlenecks caused by port saturation. And broadcast storm suppression prevents broadcast traffic storms from engulfing the network. Some of the management features are described below. For a detailed description, refer to the Management Guide that is included with the switch.

## **Spanning Tree Protocol**

The TigerSwitch 1000 supports ANSI/IEEE 802.1d Spanning Tree Protocol. This protocol adds a level of fault tolerance by allowing two or more redundant connections to be created between a pair of LAN segments. When there are multiple physical paths between segments, the protocol will choose a single path and disable all others to ensure that only one route exists between any two stations on the network. This prevents the creation of network loops. However, if the chosen path should fail for any reason, an alternate path will be activated to maintain the connection.

The default setting for the Spanning Tree Protocol is “enabled.” This protocol may be configured (enabled or disabled) out-of-band via the serial console port or in-band via the Web interface, Telnet, or SNMP network management software.

## **VLANs**

The TigerSwitch 1000 supports up to 256 VLANs. A Virtual LAN is a collection of network nodes that share the same collision domain regardless of their physical location or connection point in the network. By segmenting your network into VLANs, you can:

- Eliminate broadcast storms which severely degrade performance in a flat network.
- Simplify network management for node changes/moves by remotely configuring VLAN membership for the concerned port, rather than having to manually change the node's IP address.
- Provide data security by restricting all traffic to the originating VLAN, except where a connection has been configured between separate VLANs using a router or Layer 3 switch.

**Multicast Switching**

Specific multicast traffic can be assigned to its own VLAN to ensure that it does not interfere with normal network traffic and to guarantee real-time delivery by setting the required priority level for the designated VLAN. The switch uses IGMP Snooping and IGMP to manage multicast group registration.

**Traffic Priority**

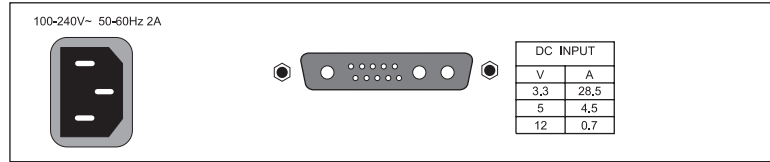
This switch provides Quality of Service (QoS) by prioritizing each packet based on the required level of service, using two distinct categories with Weighted Fair Queuing. It uses IEEE 802.1Q and 802.1p tags to prioritize incoming traffic based on input from the end-station application driver. These functions can be used, for example, to provide independent priorities for real-time video, real-time voice, guaranteed-delivery data, or best-effort data.

**Optional Redundant Power Unit**

SMC provides an optional Redundant Power Unit (RPU), SMCRPU150W, that can supply power to the switch in the event of failure of the internal power supply.

**Power Supply Receptacles**

There are two power receptacles on the rear panel of the switch. The standard power receptacle is for the AC power cord. The receptacle labeled “DC Input” is for the optional Redundant Power Unit (RPU).



**Figure 1-3. Power Supply Receptacles**

## **Features and Benefits**

### **Connectivity**

- ◆ 6 10/100/1000BASE-T RJ-45 ports
- ◆ Two slots for optional GBIC modules
- ◆ Auto-negotiation of duplex mode and flow control
- ◆ IEEE 802.3ab Gigabit Ethernet compliance ensures compatibility with standards-based network cards and switches from any vendor

### **Performance**

- ◆ Transparent bridging
- ◆ Aggregate bandwidth of 16 Gbps
- ◆ Switching Table with 12K MAC address entries
- ◆ Provides Store-and-Forward switching
- ◆ Filtering and forwarding at line speed
- ◆ Broadcast storm suppression
- ◆ Includes support for an optional Redundant Power Unit
- ◆ Desktop or rack-mountable
- ◆ Limited lifetime warranty

## **Management**

- ◆ “At-a-glance” LEDs for easy troubleshooting
- ◆ Network management agent:
  - Supports Telnet, SNMP/RMON and Web-based interface
  - Spanning Tree Protocol for redundant network connections
  - VLAN support for 256 groups, port-based or with 802.1Q VLAN tagging
  - Quality of Service (QoS) supports two priority queues and Weighted Fair Queueing
  - Multicast Switching based on IGMP (Internet Group Management Protocol) Snooping and Multicast Filtering



# CHAPTER 2

## NETWORK PLANNING

---

### **Introduction to Switching**

A network switch allows simultaneous transmission of multiple packets via non-crossbar switching. This means that it can partition a network more efficiently than bridges or routers. The switch has, therefore, been recognized as one of the most important building blocks for today's networking technology.

When performance bottlenecks are caused by congestion at the network access point (such as the network card for a high-volume file server), the device experiencing congestion (server, power user or hub) can be attached directly to a switched port. And, by using full-duplex mode, the bandwidth of the dedicated segment can be doubled to maximize throughput.

When networks are based on repeater (hub) technology, the maximum distance between end stations is limited. For Ethernet, there may be up to four hubs between any pair of stations; for Fast Ethernet, the maximum is two. This is known as the hop count. However, a switch turns the hop count back to zero, so subdividing the network into smaller and more manageable segments, and linking them to the larger network by means of a switch, removes this limitation.

A switch can be easily configured in any Ethernet or Fast Ethernet network to significantly boost bandwidth while using conventional cabling and network cards.

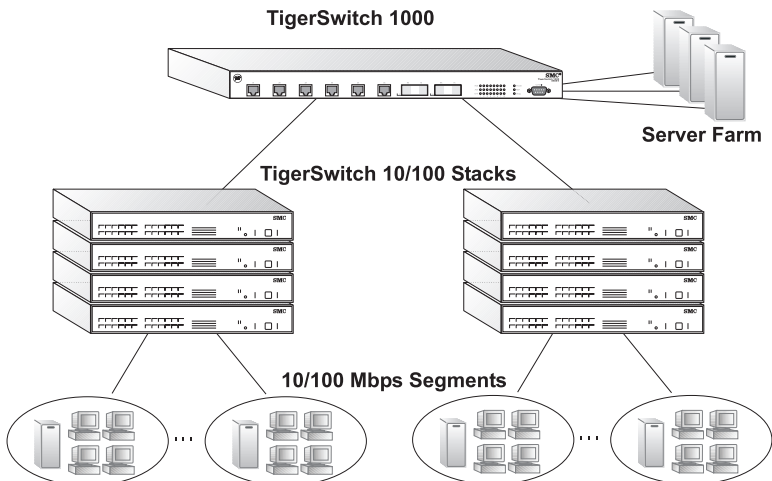
## Sample Applications

The TigerSwitch 1000 is designed to consolidate your network core providing high-bandwidth connections between workgroup switches and server farms. Some typical applications are described in this section.

### Backbone Consolidation

The TigerSwitch 1000 can consolidate a switched network backbone down into a single efficient bridged node, increasing overall bandwidth and throughput.

In the figure below, the 1000BASE-T ports on the TigerSwitch 1000 are providing 2 Gbps full-duplex connectivity to TigerSwitch 10/100 stacks and high-volume servers.

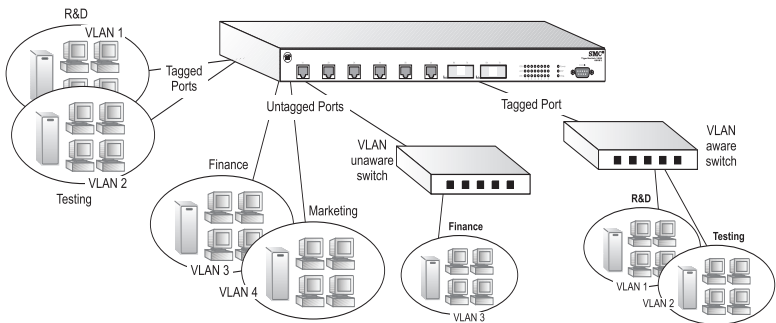


**Figure 2-1. Backbone Consolidation**

## Making VLAN Connections

VLANs can be based on port groups, or each data frame can be explicitly tagged to identify the VLAN group it belongs to. When using port-based VLANs, ports can either be assigned to one specific group or to all groups. Port-based VLANs are suitable for small networks. A single switch can be easily configured to support several VLAN groups for various organizational entities (such as Finance and Marketing).

When you expand port-based VLANs across several switches, you need to make a separate connection for each VLAN group. This approach is, however, inconsistent with the Spanning Tree Protocol, which can easily segregate ports that belong to the same VLAN. When VLANs cross separate switches, it is therefore better to use VLAN tagging. This allows you assign multiple VLAN groups to the trunk ports (that is, tagged ports) connecting different switches.



**Figure 2-2. Making VLAN Connections**

**Note:** When connecting to a switch that does not support IEEE 802.1Q VLAN tags, use untagged ports.

# Connectivity Rules

When adding hubs (repeaters) to your network, please follow the connectivity rules listed below for Ethernet and Fast Ethernet. However, note that because switches break up the path for connected devices into separate collision domains, you should not include the switch or connected cabling in your calculations for cascade length involving other devices.

## 1000 Mbps Gigabit Ethernet Collision Domain

### Maximum Fiber Optic Cable Distance for 1000BASE-SX

Fiber Size	Fiber Bandwidth	Maximum Cable Length
62.5/125 micron	160 MHz/km	2-220 m (7-722 ft)
	200 MHz/km	2-275 m (7-902 ft)
50/125 micron	400 MHz/km	2-500 m (7-1641 ft)
	500 MHz/km	2-550 m (7-1805 ft)

### Maximum Fiber Optic Cable Distance for 1000BASE-LX

Fiber Size	Fiber Bandwidth	Maximum Cable Length
9/125 micron	N/A	2 m - 5 km (7 - 16404 ft)

### Maximum Cable Distance for 1000BASE-T

Type	Connector	Maximum Cable Length
Cat. 5, 5e 100-ohm UTP	RJ-45	100 m (328 ft)

## 100 Mbps Fast Ethernet Collision Domain

### SMC 3-2 Rule for Class II Repeaters

Between any two PCs or other stations in the same 100BASE-TX collision domain, there may be:

- up to 3 link segments and
- up to 2 Class II repeaters (hubs)

### SMC 2-1 Rule for Class I Repeaters

Between any two PCs or other stations in the same 100BASE-TX collision domain, there may be:

- up to 2 link segments and
- up to 1 Class I repeater (hub)

### Maximum 100BASE-TX Network Diameter Using Repeaters

Repeater Type and Number	Twisted Pair 100BASE-TX
1 Class I	200 m (656 ft.)
1 Class II	200 m (656 ft.)
2 Class II	205 m (672.4 ft.)

### Maximum Fast Ethernet Cable Distance

Cable Type	Connecting	Max. Distance
Twisted Pair	Any two devices	100 m (328 ft.)
Fiber	Switch to switch, server or PC	
	Half duplex	412 m (1,351.4 ft.)
	Full duplex	2 km (1.24 mi.)

## 10 Mbps Ethernet Collision Domain

### SMC 5-4-3 Rule

Between any two PCs or other stations in the same 10 Mbps collision domain, there may be:

- up to 5 link segments in series,
- up to 4 repeaters (hubs),
- up to 3 populated cable segments, that is, segments attached to two or more PCs (coax networks only).\*

\* The remaining two segments are unpopulated; these are known as inter-repeater links or IRLs. This distinction between populated and unpopulated segments is significant for coax networks only.

### Maximum Cable Length

Cable Type	Maximum Length
Twisted Pair, Categories 3, 4, 5	100 m (328 ft.)
Thin Coax	185 m (607 ft.)
External Transceiver Drop	50 m (165 ft.)

## Application Notes

1. Full-duplex operation only applies to point-to-point access, such as when a switch is attached to a workstation, server or another switch.
2. For network applications that actually require routing, such as when interconnecting dissimilar network types or distinct VLANs, you may have to attach the TigerSwitch 1000 directly to a router or Layer 3 switch.

# CHAPTER 3

## INSTALLING THE SWITCH

---

### Selecting a Site

TigerSwitch 1000 units can be mounted in a standard 19-inch equipment rack or on a flat surface. Be sure to follow the guidelines below when choosing a location.

- ◆ The site should:
  - be at the center of all the devices you want to link and near a power outlet.
  - be able to maintain its temperature within 0° to 50° C and its humidity within 5% to 95%, non-condensing
  - provide adequate space (approximately two inches) on all sides for proper air flow
  - be accessible for installing, cabling and maintaining the devices
  - allow the status LEDs to be clearly visible
- ◆ Make sure twisted-pair cable is always routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference, such as radios, transmitters, etc.
- ◆ Make sure that a separate grounded power outlet that provides 100 to 240 VAC, 50 to 60 Hz, is within 8 feet (2.44 m) of each device and is powered from an independent circuit breaker. As with any equipment, using a filter or surge suppressor is recommended.

## **Equipment Checklist**

After unpacking the TigerSwitch 1000, check the contents to be sure you have received all the components. Then, before beginning the installation, be sure you have all other necessary installation equipment.

### **Package Contents**

- ◆ TigerSwitch 1000 (SMC8606T) unit
- ◆ Four adhesive foot pads
- ◆ Bracket Mounting Kit containing two brackets and four screws for attaching the brackets to the switch
- ◆ Power Cord—either US, Continental Europe or UK
- ◆ This Installation Guide
- ◆ Management Guide
- ◆ SMC Warranty Registration Card—be sure to complete and return to SMC

### **Optional Rack-Mounting Equipment**

If you plan to rack-mount the switch, be sure to have the following equipment available:

- ◆ Four mounting screws for each device you plan to install in a rack—these are not included
- ◆ A screwdriver (Phillips or flathead, depending on the type of screws used)



## **Mounting**

A TigerSwitch 1000 unit can be mounted in a standard 19-inch equipment rack or on a desktop or shelf. Mounting instructions for each type of site follow.

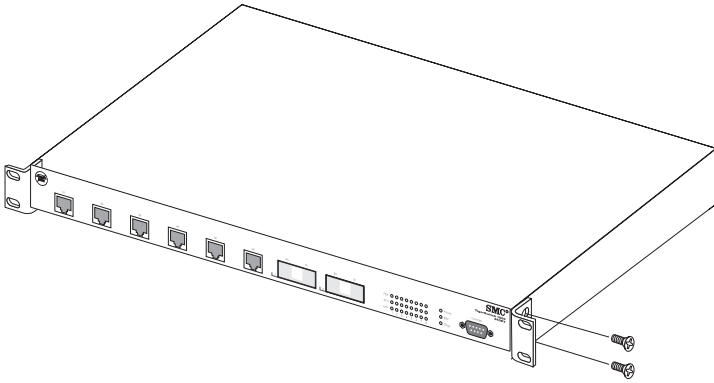
### **Rack Mounting**

Before rack mounting the switch, pay particular attention to the following factors:

- ◆ **Temperature:** Since the temperature within a rack assembly may be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range. (See Appendix C)
- ◆ **Mechanical Loading:** Do not place any equipment on top of a rack-mounted unit
- ◆ **Circuit Overloading:** Be sure that the supply circuit to the rack assembly is not overloaded.
- ◆ **Grounding:** Rack-mounted equipment should be properly grounded. Particular attention should be given to supply connections other than direct connections to the mains.

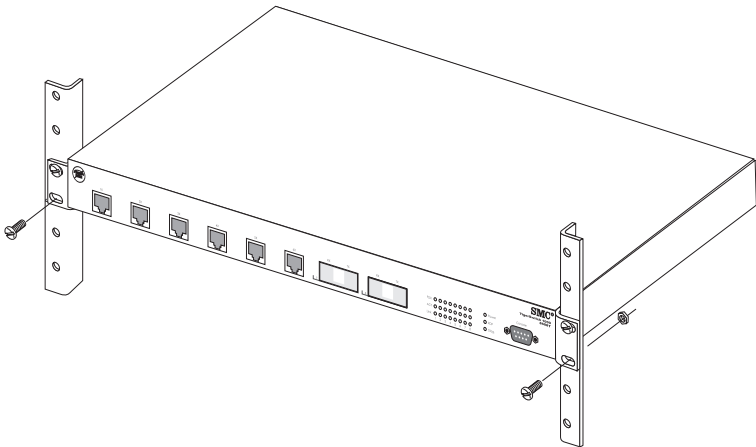
To rack-mount devices:

1. Attach the brackets to the device using the screws provided in the Bracket Mounting Kit.



**Figure 3-1. Attaching the Brackets**

2. Mount the device in the rack, using four rack-mounting screws (not provided).



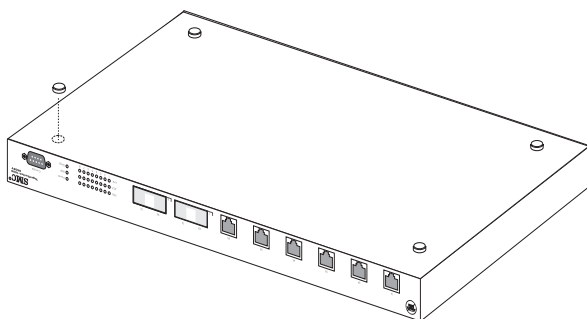
**Figure 3-2. Installing the Switch in a Rack**

3. If installing a single switch only, turn to “Connecting to a Power Source” at the end of this chapter.

4. If installing multiple switches, mount them in the rack, one below the other, in any order.
5. If also installing RPU's, mount them in the rack below the other devices.

## **Desktop or Shelf Mounting**

1. Attach the four adhesive feet to the bottom of the first switch.



**Figure 3-3. Attaching the Adhesive Feet**

2. Set the device on a flat surface near an AC power source, making sure there are at least two inches of space on all sides for proper air flow.
3. If installing a single switch only, go to “Connecting to a Power Source” at the end of this chapter.
4. If installing multiple switches, attach four adhesive feet to each one. Place each device squarely on top of the one below, in any order.
5. If also installing RPU's, place them close to the stack.

## Installing a GBIC Transceiver

The two slots on the switch front panel are for installing optional GBIC transceivers. The GBIC slots support the following transceivers:

- ◆ 1000BASE-SX
- ◆ 1000BASE-LX

The 1000BASE-SX GBIC transceivers provide one short-wavelength (850 nm) Gigabit port that can be used for a high-speed backbone or server connection. This port can be connected to a site up to 550 m (1805 ft) away with multimode fiber cable.

The 1000BASE-LX GBIC transceivers provide one long-wavelength (1300 nm) Gigabit port that can be used for a high-speed backbone or server connection. This port can be connected to a site up to 5 km (16404 ft) away with single-mode fiber cable.

**Caution:** Install only 5 V GBIC transceivers into the GBIC slots.

You can install a GBIC transceiver as described below:

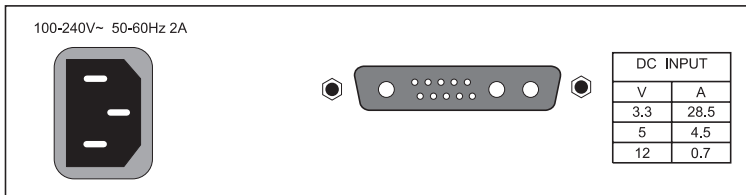
1. Insert the transceiver with the SC connector facing out toward you. Note that the transceiver is keyed so that it can only be installed in one orientation.
2. Press in on the transceiver's side tabs, and gently slide it into the GBIC interface slot until it clicks into place.

**Note:** GBIC transceivers are hot-swappable. You do not need to power off the switch before installing or removing a transceiver.

## Connecting to a Power Source

To connect a device to a power source:

1. Insert the power cable plug directly into the receptacle located at the back of the device.



**Figure 3-4. Power Receptacle**

2. Plug the other end of the cable into a grounded, 3-pin socket.

**Note:** For International use, you may need to change the AC line cord. You must use a line cord set that has been approved for the receptacle type in your country.

3. Check the front-panel LEDs as the device is powered on to be sure the Power LED is lit. If not, check that the power cable is correctly plugged in.
4. If you have a purchased Redundant Power Unit, connect it to the device and to an AC power source now, following the instructions included with the package.

## *INSTALLING THE SWITCH*

# CHAPTER 4

## MAKING NETWORK CONNECTIONS

---

### **Connecting Network Devices**

The TigerSwitch 1000 is designed to connect to IEEE 802.3ab compliant devices. For most applications, the TigerSwitch 1000 would be connected to other switches in the network backbone. It may also be connected directly to Gigabit Ethernet network cards in PCs and servers.

## Connecting to 1000BASE-T Devices

The RJ-45 ports on the TigerSwitch 1000 operate at 10 Mbps, 100 Mbps, and 1000 Mbps, full and half duplex, with support for auto-negotiation of speed, duplex mode and flow control. You can connect any RJ-45 port on the switch to any server or workstation, or uplink to a network device such as another switch or a router. The 1000BASE-T standard uses four pairs of Category 5 twisted-pair cable for connections up to a maximum length of 100 m (328 feet).

**Note:** For 1000 Mbps operation, you should first test the cable installation for IEEE 802.3ab 1000BASE-T compliance. See “1000BASE-T Cable Requirements” on page F-47 for more information.

1. Prepare the devices you wish to network. For 1000 Mbps operation, make sure that servers and workstations have installed 1000BASE-T network interface cards. Other network devices should have RJ-45 ports that comply with the IEEE 802.3ab 1000BASE-T standard.
2. Prepare shielded or unshielded twisted-pair cables (straight-through or crossover) with RJ-45 plugs at both ends. Use 100-ohm Category 5 (Category 5e or better is recommended) cable for 1000 Mbps Gigabit Ethernet connections.
3. Connect one end of the cable to the RJ-45 port on the other device, and the other end to any available RJ-45 port on the switch. When inserting an RJ-45 plug, be sure the tab on the plug clicks into position to ensure that it is properly seated.

**Caution:** Do not plug a phone jack connector into any RJ-45 port. This may damage the switch. Instead, use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.



**Note:** For 1000 Mbps operation, all four wire pairs in the cable must be connected. 1000BASE-T ports support the Auto MDI/MDI-X feature, which means that at any operating speed (10, 100, or 1000 Mbps), either straight-through or crossover cables can be used to connect to any server, workstation, or other network device. Make sure each twisted-pair cable does not exceed 100 meters (328 feet).

## Connecting to an SC-Type Fiber Port

When connecting fiber cable to a 1000BASE-SX or 1000BASE-LX (GBIC) port on the switch, be sure you use an SC-type connector. Follow the steps below.

**Warning:** This switch uses lasers to transmit signals over fiber optic cable. The lasers are compliant with the requirements of a Class 1 Laser Product and are inherently eye safe in normal operation. However, you should never look directly at a transmit port when it is powered on.

1. Remove and keep the SC port's rubber cover. When not connected to a fiber cable, the rubber cover should be replaced to protect the optics.
2. Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.
3. Connect one end of the cable to the SC port on the switch and the other end to the SC port on the other device. Since SC connectors are keyed, the cable can be attached in only one orientation. When inserting the cable, be sure the tab on the plug clicks into position to ensure that it is properly seated.

All the SC-type ports operate at 1000 Mbps with support for auto-negotiation of duplex mode (full/half) and flow control. Also note the maximum length for 1000BASE-SX and 1000BASE-LX fiber optic cable depends on the core size and the rating of the cable, as shown in the following table.

<b>Maximum 1000BASE-SX Gigabit Ethernet Cable Length</b>		
<b>Fiber Size</b>	<b>Fiber Bandwidth</b>	<b>Maximum Cable Length</b>
62.5/125 micron	160 MHz/km	2-220 m (7-722 ft)
	200 MHz/km	2-275 m (7-902 ft)
50/125 micron	400 MHz/km	2-500 m (7-1641 ft)
	500 MHz/km	2-550 m (7-1805 ft)

<b>Maximum 1000BASE-LX Gigabit Ethernet Cable Length</b>		
<b>Fiber Size</b>	<b>Fiber Bandwidth</b>	<b>Maximum Cable Length</b>
9/125 micron	N/A	2 m - 5 km (7 - 16404 ft)

# APPENDIX A

## TROUBLESHOOTING

---

### Diagnosing Switch Indicators

Troubleshooting Chart	
Symptom	Action
Power LED is Off	<ul style="list-style-type: none"><li>• Internal or redundant power supply has failed or is disconnected.</li><li>• Check connections between the switch, the power cord, the wall outlet, and the RPU if you are using one.</li><li>• Contact SMC Technical Support.</li></ul>
Link LED is Off	<ul style="list-style-type: none"><li>• Verify that the switch and attached device are powered on.</li><li>• Be sure the cable is plugged into both the switch and corresponding device.</li><li>• Verify that the proper cable type is used and its length does not exceed specified limits.</li><li>• Check the adapter on the attached device and cable connections for possible defects. Replace the defective adapter or cable if necessary.</li></ul>

### Power and Cooling Problems

If the power indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply. However, if the unit powers off after running for a while, check for loose power connections, power losses or surges at the power outlet, and verify that the fans

on the unit are unobstructed and running prior to shutdown. If you still cannot isolate the problem, then the internal power supply may be defective. In this case, contact SMC Technical Support for assistance.

## **Installation**

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (such as the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

## **In-Band Access**

You can access the management agent in the switch from anywhere within the attached network using Telnet, a Web browser, or other network management software such as EliteView. However, you must first configure the switch with a valid IP address, subnet mask, and default gateway. If you have trouble establishing a link to the management agent, check to see if you have a valid network connection. Then verify that you entered the correct IP address. Also, be sure the port through which you are connecting to the switch has not been disabled. If it has not been disabled, then check the network cabling that runs between your remote location and the switch.

**Note:** You can configure the management agent to accept from one to four simultaneous Telnet sessions. If the maximum number of sessions already exists, an additional Telnet connection will not be able to log into the system.

# APPENDIX B

## CABLES

---

### Specifications

Cable Types and Specifications			
Cable	Type	Max. Length	Connector
1000BASE-T	Cat. 5, 5e 100-ohm UTP	100 m (328 ft)	RJ-45

Maximum 1000BASE-SX Gigabit Ethernet Cable Length		
Fiber Size	Fiber Bandwidth	Maximum Cable Length
62.5/125 micron	160 MHz/km	2-220 m (7-722 ft)
	200 MHz/km	2-275 m (7-902 ft)
50/125 micron	400 MHz/km	2-500 m (7-1641 ft)
	500 MHz/km	2-550 m (7-1805 ft)

Maximum 1000BASE-LX Gigabit Ethernet Cable Length		
Fiber Size	Fiber Bandwidth	Maximum Cable Length
9/125 micron	N/A	2 m - 5 km (7 - 16404 ft)

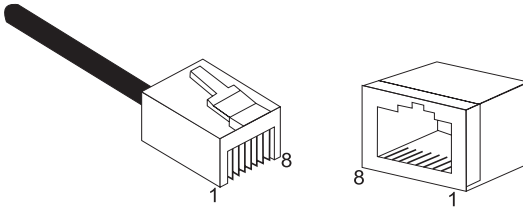
## Twisted-Pair Cable and Pin Assignments

**Caution:** **DO NOT** plug a phone jack connector into any RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

The RJ-45 ports on the switch support 1000, 100 and 10 Mbps Ethernet operation, with auto-negotiation of flow control.

**Caution:** Each wire pair must be attached to the RJ-45 connectors in a specific orientation.

The figure below illustrates how the pins on the RJ-45 connector are numbered. Be sure to hold the connectors in the same orientation when attaching the wires to the pins.



### 1000BASE-T Pin Assignments

1000BASE-T ports support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. In straight-through cable, pins 1-8, at one end of the cable, are connected straight through to pins 1-8 at the other end of the cable.

Use 100-ohm Category 5 or 5e unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for 1000BASE-T connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

The table below shows the 1000BASE-T MDI and MDI-X port pinouts. These ports require that all four pairs of wires be connected.

Note that for 1000BASE-T operation, all four pairs of wires are used for both transmit and receive.

Pin	MDI Signal Name	MDI-X Signal Name
1	Transmit Data plus (TD1+)	Transmit Data plus (TD2 +)
2	Receive Data minus (RD1-)	Receive Data minus (RD2-)
3	Transmit Data plus (TD2+)	Transmit Data plus (TD1+)
4	Transmit Data plus (TD3+)	Transmit Data plus (TD4+)
5	Receive Data minus (RD3-)	Receive Data minus (RD4-)
6	Receive Data minus (RD2-)	Receive Data minus (RD1-)
7	Transmit Data plus (TD4+)	Transmit Data plus (TD3+)
8	Receive Data minus (RD4-)	Receive Data minus (RD3-)

## 1000BASE-T Cable Requirements

All Category 5 UTP cables that are used for 100BASE-TX connections should also work for 1000BASE-T, providing that all four wire pairs are connected. However, it is recommended that for all critical connections, or any new cable installations, Category 5e (enhanced Category 5) cable should be used. The Category 5e specification includes test parameters that are only recommendations for Category 5. Therefore, the first step in preparing existing Category 5 cabling for running 1000BASE-T is a simple test of the cable installation to be sure that it complies with the IEEE 802.3ab standards.

### Cable Testing for Existing Category 5 Cable

Installed Category 5 cabling must pass tests for Attenuation, Near-End Crosstalk (NEXT), and Far-End Crosstalk (FEXT). This cable testing information is specified in the ANSI/TIA/EIA-TSB-67 standard. Additionally, cables must also pass test parameters for Return Loss and Equal-Level Far-End Crosstalk (ELFEXT). These tests are specified in the ANSI/TIA/EIA-TSB-95 Bulletin, "The Additional Transmission Performance Guidelines for 100 Ohm 4-Pair Category 5 Cabling."

Note that when testing your cable installation, be sure to include all patch cables between switches and end devices.

### Adjusting Existing Category 5 Cabling

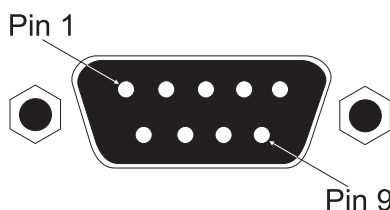
If your existing Category 5 installation does not meet one of the test parameters for 1000BASE-T, there are basically three measures that can be applied to try to correct the problem:

1. Replace any Category 5 patch cables with high-performance Category 5e cables.
2. Reduce the number of connectors used in the link.
3. Reconnect some of the connectors in the link.



## Console Port Pin Assignments

The DB-9 serial port on the switch's rear panel is used to connect to the switch for out-of-band console configuration. The on-board menu-driven configuration program can be accessed from a terminal or a PC running a terminal emulation program. The pin assignments used to connect to the serial port are provided in the following tables.



**Figure B-1. DB-9 Console Port Pin Numbers**

## DB-9 Port Pin Assignments

EIA Circuit	CCITT Signal	Description	Switch's DB9 DTE Pin #	PC DB9 DTE Pin #	Signal Direction DTE-DCE
CF	109	<b>DCD</b> (Data Carrier Detected)	1	1	<-----
BB	104	<b>RxD</b> (Received Data)	2	2	<-----
BA	103	<b>TxD</b> (Transmitted Data)	3	3	----->
CD	108.2	<b>DTR</b> (Data Terminal Ready)	4	4	----->
AB	102	<b>SG</b> (Signal Ground)	5	5	-----
CC	107	<b>DSR</b> (Data Set Ready)	6	6	<-----
CA	105	<b>RTS</b> (Request-to-Send)	7	7	----->
CB	106	<b>CTS</b> (Clear-to-Send)	8	8	<-----
CE	125	<b>RI</b> (Ring Indicator)	9	9	<-----

Console Port to 9-Pin COM Port on PC

Switch's 9-Pin Serial Port	CCITT Signal	PC's 9-Pin COM Port
1 DCD	----- DCD -----	1
2 RXD	<----- TXD -----	3
3 TXD	----- RXD ----->	2
4 DTR	----- DSR ----->	6
5 SGND	----- SGND -----	5
6 DSR	----- DTR -----	4
7 RTS	----- CTS ----->	8
8 CTS	<----- RTS -----	7
9 RI	----- RI -----	9

Console Port to 25-Pin DTE Port on PC

Switch's 9-Pin Serial Port	Null Modem		PC's 25-Pin DTE Port
1 DCD	1	1	8 DCD
2 RXD	2	3	3 TXD
3 TXD	3	2	2 RXD
4 DTR	4	8	20 DTR
5 SGND	5	20	7 SGND
6 DSR	6	7	6 DSR
7 RTS	7	4	4 RTS
8 CTS	9	5	5 CTS
9 RI	20	6	22 RI

# APPENDIX C

## SPECIFICATIONS

---

### Physical Characteristics

**Ports**

6 RJ-45 ports  
2 GBIC slots

**Network Interface**

RJ-45 connector, 100-ohm Category 5 or 5e UTP or STP cable  
(using all four wire pairs)

**Buffer Architecture**

2 Mbytes per port

**Aggregate Bandwidth**

16 Gbps

**Switching Database**

12K MAC address entries

**LEDs**

System: Power, RPU, Diag  
Port: Link, ACT, FDX

**Weight**

10.14 lbs (4.6 kg)

**Size**

17.37 x 11.22 x 1.699 in (44.0 x 28.5 x 4.3 cm)

**Temperature**

Operating: 32 to 122°F (0 to 50°C)  
Storage: -40 to 158°F (-40 to 70°C)

**Humidity**

Operating: 5% to 95%

**Power Supply**

Internal, auto-ranging transformer: 100 to 240 VAC, 50 to 60 Hz

Redundant DC input

**Power Consumption**

70 Watts maximum

**Heat Dissipation**

239 BTU/hr maximum

**Maximum Current**

0.5A @ 110VAC

0.7A @ 240VAC

## **Switch Features**

**Spanning Tree Protocol**

**Broadcast Storm Suppression**

**Forwarding Mode**

Store-and-forward

**Flow Control**

IEEE 802.3x

**VLAN Support**

Up to 256 groups; port-based or with IEEE 802.1Q VLAN tagging

**Quality of Service**

Supports two priority queues with Weighted Fair Queueing

## **Management Features**

### **In-Band Management**

Telnet, Web-based HTTP, or SNMP manager

### **Out-of-Band Management**

RS-232 DB-9 console port

### **Software Loading**

TFTP in-band or XModem out-of-band

### **MIB Support**

MIB II (RFC 1213), Bridge MIB (RFC 1493), Ethernet-Like MIB (RFC 1643), RMON MIB (RFC 1757), SMC's private MIB

### **RMON Support**

Groups 1, 2, 3, 9 (Statistics, History, Alarm, Event)

### **Additional Features**

Port Mirroring

Port Trunking

IGMP Snooping and Multicast Filtering

## **Standards**

IEEE 802.3z Gigabit Ethernet

IEEE 802.3ab Gigabit Ethernet

IEEE 802.1D Spanning Tree Protocol

IEEE 802.1p priority tags

IEEE 802.1Q VLANs

IEEE 802.3ac VLAN tagging

IEEE 802.3x full-duplex flow control

ISO/IEC 8802-3

SNMP (RFC 1157), RMON (RFC 1757), ARP (RFC 826), IGMP (RFC 1112), MIB II (RFC 1213), Ethernet-Like MIB (RFC 1643), Bridge

MIB (RFC 1493)

## **Compliances**

CE Mark

### **Emissions**

FCC Class A

Industry Canada Class A

EN55022 (CISPR 22) Class A

VCCI Class A

EN 61000-3-2/3

C-Tick - AS/NZS 3548 (1995) Class A

### **Immunity**

EN 61000-4-2/3/4/6/8/10/11

### **Safety**

CSA/NRTL (UL1950, CSA 22.2.950)

TUV/GS(EN60950)

## **Warranty**

Limited lifetime

# APPENDIX D

## ORDERING INFORMATION

---

TigerSwitch 1000 Products and Accessories	
Product Number	Description
SMC8606T	6-port Gigabit Ethernet switch with two GBIC slots
SMCRPU150W*	Redundant Power Unit with cables, supports one device

\* Also available in models for Continental Europe and the UK.

*ORDERING INFORMATION*



# GLOSSARY

## **10BASE-T**

IEEE 802.3 specification for 10 Mbps Ethernet over two pairs of Category 3, 4, or 5 UTP cable..

## **100BASE-TX**

IEEE 802.3u specification for 100 Mbps Fast Ethernet over two pairs of Category 5 UTP cable.

## **1000BASE-T**

IEEE 802.3ab specification for Gigabit Ethernet over two pairs of Category 5, 5e 100-ohm UTP cable.

## **Auto-Negotiation**

Signalling method allowing each node to select its optimum operational mode (e.g., 10 Mbps or 100 Mbps and half or full duplex) based on the capabilities of the node to which it is connected.

## **Bandwidth**

The difference between the highest and lowest frequencies available for network signals. Also synonymous with wire speed, the actual speed of the data transmission along the cable.

**Class I Repeater**

Fast Ethernet repeater that is principally used to connect different physical signaling systems (e.g., 100BASE-TX, 100BASE-FX) and that has an internal delay such that only one repeater of this type can reside within a single collision domain when maximum cable lengths are used.

**Class II Repeater**

Fast Ethernet repeater that typically supports a single physical signaling system (e.g., 100BASE-TX, or 100BASE-FX) and that has a smaller internal delay so that two such repeaters can reside within a single collision domain when maximum cable lengths are used.

**Collision**

A condition in which packets transmitted over the cable interfere with each other. Their interference makes both signals unintelligible.

**Collision Domain**

Single CSMA/CD LAN segment.

**CSMA/CD**

Carrier Sense Multiple Access/Collision Detect is the communication method employed by Ethernet and Fast Ethernet.

**Crossover Port**

Twisted-pair port with a built-in wiring crossover.

**End Station**

A workstation, server, or other device that does not act as a network interconnection.

**Ethernet**

A network communication system developed and standardized by DEC, Intel, and Xerox, using baseband transmission, CSMA/CD access, logical bus topology, and coaxial cable. The successor IEEE 802.3 standard provides for integration into the OSI model and extends the physical layer and media with repeaters and implementations that operate on fiber, thin coax and twisted-pair cable.

**Fast Ethernet**

A 100 Mbps network communication system based on Ethernet and the CSMA/CD access method.

**Fast Ethernet Switch**

Device that provides a full 100 Mbps bandwidth (or either 10 or 100 Mbps bandwidth with auto-negotiation) to each port (LAN segment).

**Full Duplex**

Transmission method that allows switch and network card to transmit and receive concurrently, effectively doubling the bandwidth of that link.

**Gigabit Ethernet**

A 1000 Mbps network communication system based on Ethernet and the CSMA/CD access method.

**IEEE 802.3**

Defines carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.

**IEEE 802.3ac**

Defines frame extensions for VLAN tagging.

**IEEE 802.3u**

Defines CSMA/CD access method and physical layer specifications for 100BASE-TX Fast Ethernet.

**IEEE 802.3x**

Defines Ethernet frame start/stop requests and timers used for flow control on full-duplex links.

**IEEE 802.3z**

Defines CSMA/CD access method and physical layer specifications for 1000BASE Gigabit Ethernet.

**IGMP Snooping**

Listening to IGMP Query and IGMP Report packets transferred between IP Multicast Routers and IP Multicast host groups to identify IP Multicast group members.

**LAN Segment**

Separate LAN or collision domain.

**Layer 3**

Network layer in the ISO 7-Layer Data Communications Protocol. This layer handles the routing functions for data moving from one open system to another.

**LED**

Light emitting diode used for monitoring a device or network condition.

**Link Segment**

Length of twisted-pair or fiber cable joining a pair of repeaters or a repeater and a PC.

**Local Area Network (LAN)**

A group of interconnected computer and support devices.

**Media Access Control (MAC)**

A portion of the networking protocol that governs access to the transmission medium, facilitating the exchange of data between network nodes.

**MIB**

An acronym for Management Information Base. It is a set of database objects that contains information about the device.

**MII**

Media Independent Interface, the standard interface for Fast Ethernet—similar to the AUI interface for traditional Ethernet.

**Network Diameter**

Wire distance between two end stations in the same collision domain.

**RJ-45 Connector**

A connector for twisted-pair wiring.

**Redundant Power Supply (RPS)**

A backup power supply that automatically takes over in case the primary power supply should fail.

**Remote Monitoring (RMON)**

RMON provides comprehensive network monitoring capabilities. It eliminates the polling required in standard SNMP, and can set alarms on a variety of traffic conditions, including specific errors types.

**Simple Network Management Protocol (SNMP)**

An application protocol offering network management services in the Internet suite of protocols.

**Spanning Tree Algorithm (STA)**

A technology that checks your network for any loops. A loop can often occur in complicated network systems or systems with redundant links. Spanning-tree detects and directs data along the shortest path, maximizing the performance and efficiency of the network.

**Spanning Tree Protocol (STP)**

*See Spanning Tree Algorithm.*

**Straight-through Port**

An RJ-45 port which does not cross the receive and transmit signals internally so it can be connected with straight-through twisted-pair cable to any device having a crossover port. Also referred to as a “Daisy-Chain” port.

**Switched Ports**

Ports that are on separate collision domains or LAN segments.

**Telnet**

Defines a remote communication facility for interfacing to a terminal device over TCP/IP.

**Transmission Control Protocol/Internet Protocol (TCP/IP)**

Protocol suite that includes TCP as the primary transport protocol, and IP as the network layer protocol.

**UTP**

Unshielded twisted-pair cable.

**Virtual LAN (VLAN)**

A Virtual LAN is a collection of network nodes that share the same collision domain regardless of their physical location or connection point in the network. A VLAN serves as a logical workgroup with no physical barriers, allowing users to share information and resources as though located on the same LAN.





# INDEX

## Numerics

- 10 Mbps connectivity rules 2-6
- 100 Mbps connectivity rules 2-5
- 1000BASE-LX
  - fiber cable lengths 2-4
- 1000BASE-SX
  - fiber cable lengths 2-4
- 1000BASE-SX connections 4-2
- 1000BASE-SX ports 1-2
- 1000BASE-T
  - cable lengths 2-4

## A

- accessories, ordering D-1
- address table size C-1
- adhesive feet, attaching 3-5
- air flow requirements 3-1
- applications
  - backbone consolidation 2-2
  - VLAN connections 2-3

## B

- brackets, attaching 3-4
- broadcast storm control 1-4
- buffer size C-1
- buffers, saturation of 1-2

## C

- cable
  - lengths 2-4
- CE Mark i, ii
- compliances i
- connectivity rules
  - 10 Mbps 2-6
  - 100 Mbps 2-5

- 1000 Mbps 2-4
- console port 1-4
- console port pin assignments B-5
- contents of package 3-2
- cooling problems A-1
- cord sets, international 3-7

## D

- DC input 1-6
- desktop mounting 3-5
- device connections 4-1

## E

- E 1-2
- EC conformance i, ii
- electrical interference, avoiding 3-1
- EMC/safety compliance i
- equipment checklist 3-2
- Ethernet connectivity rules 2-6

## F

- Fast Ethernet connectivity rules 2-5
- fault tolerance, Spanning Tree 1-5
- FCC compliance i
- features of switch 1-7
- flow control, IEEE 802.3x 1-2
- front panel of switch 1-2
- full-duplex connectivity 2-1

## G

- Gigabit Ethernet cable lengths 2-4
- grounding for racks 3-3

## **I**

- IEEE 802.3x flow control 1-2
- IEEE 802.3z devices, connecting to 4-1
- IEEE 802.3z Gigabit Ethernet 1-7
- indicators, LED 1-3
- installation
  - desktop or shelf mounting 3-5
  - port connections 4-2
  - power requirements 3-1
  - problems A-2
  - rack mounting 3-3
  - RPUs in racks 3-5
  - site requirements 3-1

## **L**

- laser safety iv, 4-3
- LED indicators
  - ACT 1-4
  - Power 1-3
  - problems A-1
- limited warranty C-4
- location requirements 3-1

## **M**

- management
  - features 1-8, C-3
  - out-of-band 1-4
  - SNMP 1-4
  - Telnet 1-5
  - Web-based 1-4
- management agent 1-4
- MIB support C-3
- mounting the switch
  - in a rack 3-3
  - on a desktop or shelf 3-5
- multicast switching
  - IGMP 1-6

- IGMP Snooping 1-6

## **N**

- network connections 4-2
- network examples 2-2
- null-modem cable 1-4

## **O**

- ordering information D-1
- out-of-band management 1-4

## **P**

- package contents 3-2
- pin assignments B-2
- pin assignments, console port B-5
- port saturation 1-2, 1-4
- port-based VLANs 2-3
- ports, connecting to 4-2
- power, connecting to 3-7
- priority queues 1-6
- problems, troubleshooting A-1

## **Q**

- QoS 1-4

## **R**

- rack mounting 3-3
- rear panel of switch 1-2
- rear panel receptacles 1-6
- redundant power unit (RPU) 1-6
- regulatory compliance
  - BSMI compliance iii
- RJ-45 ports
  - pinouts B-3
- RMON 1-4

routing applications 2-6  
 RPs  
   connecting 3-7  
   installing in a rack 3-5  
   installing on a desktop 3-5  
 RS-232 serial port 1-4  
 rubber foot pads, attaching 3-5

## S

safety compliance iv  
 sample applications 2-2  
 screws for rack mounting 3-2  
 serial port 1-4  
 site selection 3-1  
 SNMP agent 1-4  
 Spanning Tree Protocol 1-5, 2-3  
 specifications  
   compliances C-4  
   environmental C-1  
   physical C-1  
   power C-2  
 standards compliance i, C-4  
 standards, IEEE C-3  
 status LEDs 1-3  
 surge suppressor, using 3-1  
 switching, introduction to 2-1

## T

tagging, VLAN 2-3  
 tags, priority 1-6  
 Telnet 1-5, A-2  
 temperature within a rack 3-3  
 traffic priority 1-6  
 troubleshooting  
   in-band access A-2  
   power and cooling problems A-1  
   switch indicators A-1

## U

UL compliance iv

## V

VCCI compliance i  
 VLAN tagging 2-3  
 VLANs 1-4, 1-5, 2-3

## W

warranty C-4  
 Web-based management 1-4  
 Weighted Fair Queuing 1-6





## FOR TECHNICAL SUPPORT, CALL:

From U.S.A. and Canada (24 hours, 7 days a week)  
(800) SMC-4-YOU; (949) 707-2400; (949) 707-2460 (Fax)  
From Europe (8:00 AM - 5:30 PM UK Greenwich Mean Time)  
44 (0) 1188 748740; 44 (0) 1189 748741 (Fax)

## INTERNET

E-mail addresses:

techsupport@smc.com  
european.techsupport@smc-europe.com

Driver updates:

<http://www.smc.com/support.html>

World Wide Web:

<http://www.smc.com/>

## FOR LITERATURE OR ADVERTISING RESPONSE, CALL:

U.S.A. and Canada:	(800) SMC-4-YOU;	Fax (949) 707-2460
Spain:	34-93-477-4920;	Fax 34-93-477-3774
UK:	44 (0) 1188 748700;	Fax 44 (0) 1189 748701
Southern Europe:	33 (1) 41.18.68.68;	Fax 33 (1) 41.18.68.69
Central/Eastern Europe:	49 (0) 89 92861-200;	Fax 49 (0) 89 92861-230
Nordic:	46 (8) 564 33145;	Fax 46 (8) 87 62 62
Middle East:	971-48818410;	Fax 971-48817993
South Africa:	27 (0) 11-3936491;	Fax 27 (0) 11-3936491
PRC:	86-10-6235-4958;	Fax 86-10-6235-4962
Taiwan:	886-2-2659-9669;	Fax 886-2-2659-9666
Asia Pacific:	(65) 238 6556;	Fax (65) 238 6466
Korea:	82-2-553-0860;	Fax 82-2-553-7202
Japan:	81-45-224-2332;	Fax 81-45-224-2331
Australia:	61-2-9416-0437;	Fax 61-2-9416-0474
India:	91-22-8204437;	Fax 91-22-8204443

# SMC®

Networks

6 Hughes

Irvine, CA 92618

Phone: (949) 707-2400

Model Number: SMC8606T

Publication Number: 150200001800A E092001-R02